



A.D. 1872, 7th DECEMBER. N° 3717.

Consuming Smoke.

LETTERS PATENT to William Rae Wilson Smith, of Glasgow, in the County of Lanark, North Britain, for the Invention of “**IMPROVEMENTS IN BURNING OR CONSUMING SMOKE, AND IN APPARATUS EMPLOYED THEREFOR.**”

Sealed the 14th February 1873, and dated the 7th December 1872.

PROVISIONAL SPECIFICATION left by the said William Rae Wilson Smith at the Office of the Commissioners of Patents, with his Petition, on the 7th December 1872.

I, WILLIAM RAE WILSON SMITH, of Glasgow, in the County of
5 Lanark, North Britain, do hereby declare the nature of the said In-
vention of “**IMPROVEMENTS IN BURNING OR CONSUMING SMOKE, AND IN
APPARATUS EMPLOYED THEREFOR,**” to be as follows, that is to say :—

This Invention, which relates to improvements in burning or con-
suming smoke, and in apparatus employed therefor, consists in applying
10 horizontal air tubes to the furnace or fire-box as the case may be. These

Smith's Improvements in Consuming Smoke, &c.

tubes are preferably situated above or on a level with the fire-bars, and on reaching the bridge they are then turned backwards, entering into a closed space at the front end of the hollow fire-bars, by means of which hollow fire-bars heated air or steam is conveyed to the bridge and delivered to the products of combustion passing off from the fuel by 5 openings either at the top, sides, or back thereof. A blowing fan or steam jet is or may be used for blowing or drawing air or steam through the apparatus.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Rae Wilson Smith in the Great Seal 10 Patent Office on the 7th June 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM RAE WILSON SMITH, of Glasgow, in the County of Lanark, North Britain, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her 15 Letters Patent, bearing date the Seventh day of December, in the year of our Lord One thousand eight hundred and seventy-two, in the 36th year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Rae Wilson Smith Her special license that I, the said William Rae Wilson Smith, my 20 executors, administrators, and assigns, or such others as I, the said William Rae Wilson Smith my executors, administrators, or assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United 25 Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for “**IMPROVEMENTS IN BURNING OR CONSUMING SMOKE, AND IN APPARATUS EMPLOYED THEREFOR,**” upon the condition (amongst others) that I, the said William Rae Wilson Smith, by an instrument in writing under my hand and seal, should particu- 30 larly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be

Smith's Improvements in Consuming Smoke, &c.

filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said William Rae Wilson Smith, do hereby declare the nature of my said Invention, and in what manner
5 the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the accompanying Drawings, and to the letters and figures marked thereon, that is to say :—

My said Invention, which relates to improvements in burning or con-
10 suming smoke, and in apparatus employed therefor, consists in applying horizontal air tubes to the furnace or fire-box as the case may be. These tubes are preferably situated above or on a level with the fire-bars, and on reaching the bridge they are then turned backwards, entering into a closed space at the front end of the hollow fire-bars, by means of which
15 hollow fire-bars heated air or steam, or both, is or are conveyed to the bridge and delivered to the products of combustion passing off from the fuel by openings either at the top, sides, or back thereof. A blowing fan or steam jet, or both, is or are or may be used for blowing or drawing air or steam through the apparatus.

20 And in order that my said Invention may be properly understood, I now proceed more particularly to set forth the system, mode, or manner in or under which the same is or may be used or practically carried into effect, that is to say :—

On the Sheet of Drawings hereunto appended the apparatus for
25 burning or consuming smoke, as constructed in accordance with my said Invention, is illustrated in conjunction with the furnace end of a horizontal boiler, which is shewn in vertical section at Figure 1, in horizontal section at Figure 2, in transverse section on the line *a, b*, Figures 1 and 2, at Figure 3, and in end elevation at Figure 4.

30 As shewn by these Figures, air tubes *A* are inserted into the furnace or fire-box *B* of the boiler, which tubes are by preference situated above the level of the fire-bars *C*, but they may also be situated on the same level with the fire-bars, or in any other convenient position. The tubes *A* on entering the furnace or fire-box *B*, are continued towards
35 the bridge *D*, on reaching which they are turned backwards and

Smith's Improvements in Consuming Smoke, &c.

communicate at their inner extremities with a closed space or chamber E, into which the front end of the fire-bars C are introduced, as more particularly seen at Figure 1. The air on its passage through the tubes A becomes heated, and is in that state conveyed from the space or chamber E through the fire-bars C, which are made with channels or passages 5 through them to the hollow bridge D, and is delivered therefrom through openings *c*, formed either at the top of the bridge, as shewn at Figures 1 and 2, or at the sides or back thereof, to the smoke and products of combustion passing off from the fuel in the furnace or fire-box B, which are thereby burned or consumed. 10

The air tubes A at their outer extremities are connected to a tube F, communicating with a blowing fan G, as shewn at Figure 4, for blowing or drawing air through the apparatus, or in lieu of such arrangement a steam jet may be employed to induce a current through the tubes A, space or chamber E, fire-bars C, and bridge D ; or a blowing fan and steam 15 jet may be used jointly.

Instead of employing heated air to promote the combustion of the smoke at the bridge D, steam superheated by being passed through the tubes A may be employed for that purpose. One or more doors may be situated in the front of the space or chamber E in order to facilitate 20 cleaning operations by passing a brush or other instrument into and through the chamber and hollow fire-bars.

It is to be here understood that although I have for the sake of illustration shewn my Invention on the accompanying Drawings as applied to the furnace or fire-grate of a horizontal boiler, I do not limit 25 or confine myself to employ my said Invention in conjunction with the furnaces or fire-grates of boilers, whether horizontal or otherwise, as it is equally applicable for employment in effecting the burning or consuming of the smoke or products of combustion proceeding from furnaces or fire-boxes generally. 30

Having now described and particularly ascertained the nature of my said Invention, and the system, mode, or manner in or under which the same is or may be used or practically carried into effect, I would observe in conclusion that what I consider to be novel and original, and therefore claim as the Invention secured to me by the herein-before in part 35 recited Letters Patent is, the arrangement or construction of apparatus

Smith's Improvements in Consuming Smoke, &c.

for consuming smoke in furnaces, as herein-before described, or any mere modification thereof.

5 In witness whereof, I, the said William Rae Wilson Smith, have hereunto set my hand and seal, this Fifth day of June One thousand eight hundred and seventy-three.

WILLIAM RAE WILSON SMITH. (L.S.)

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1873.

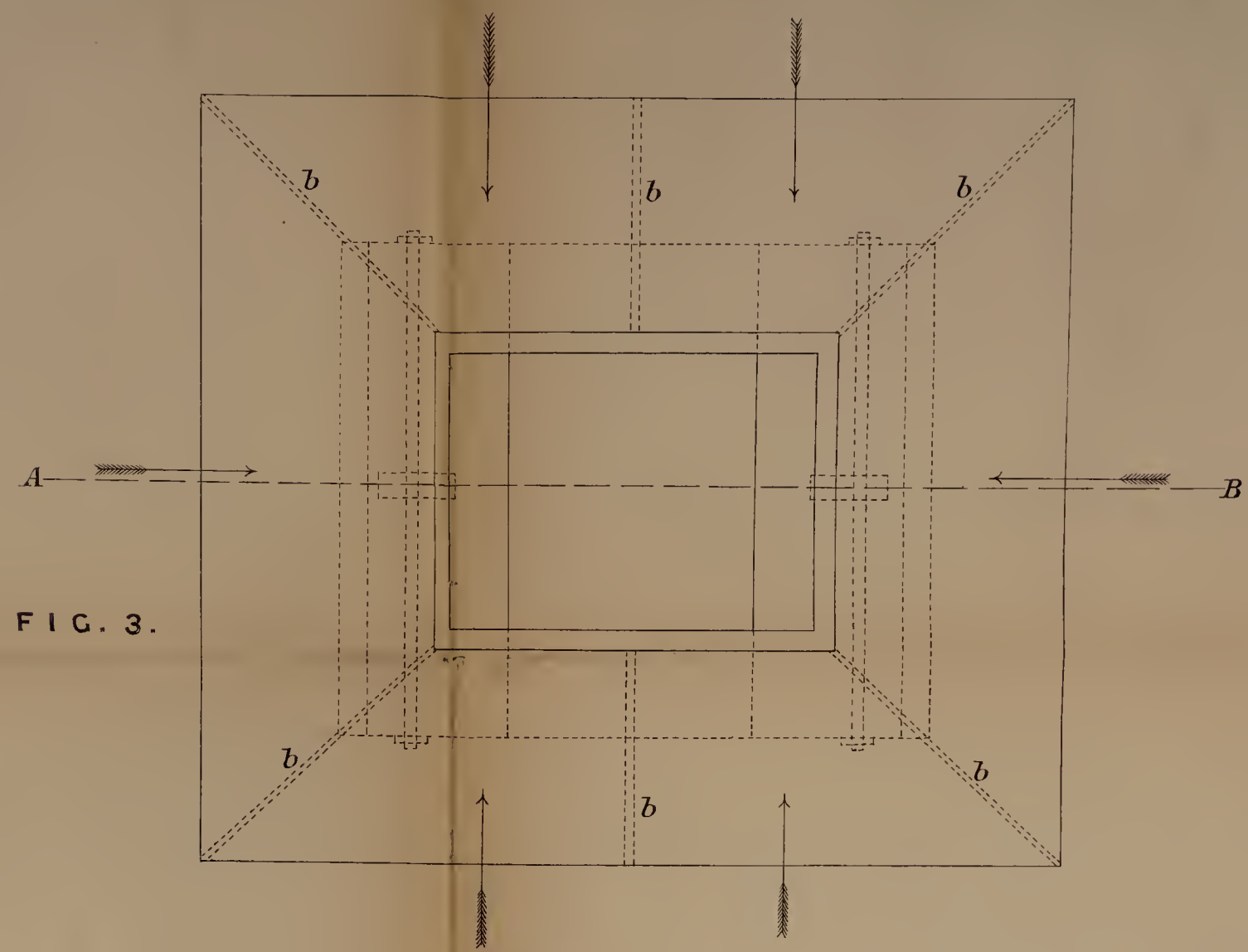


FIG. 3.

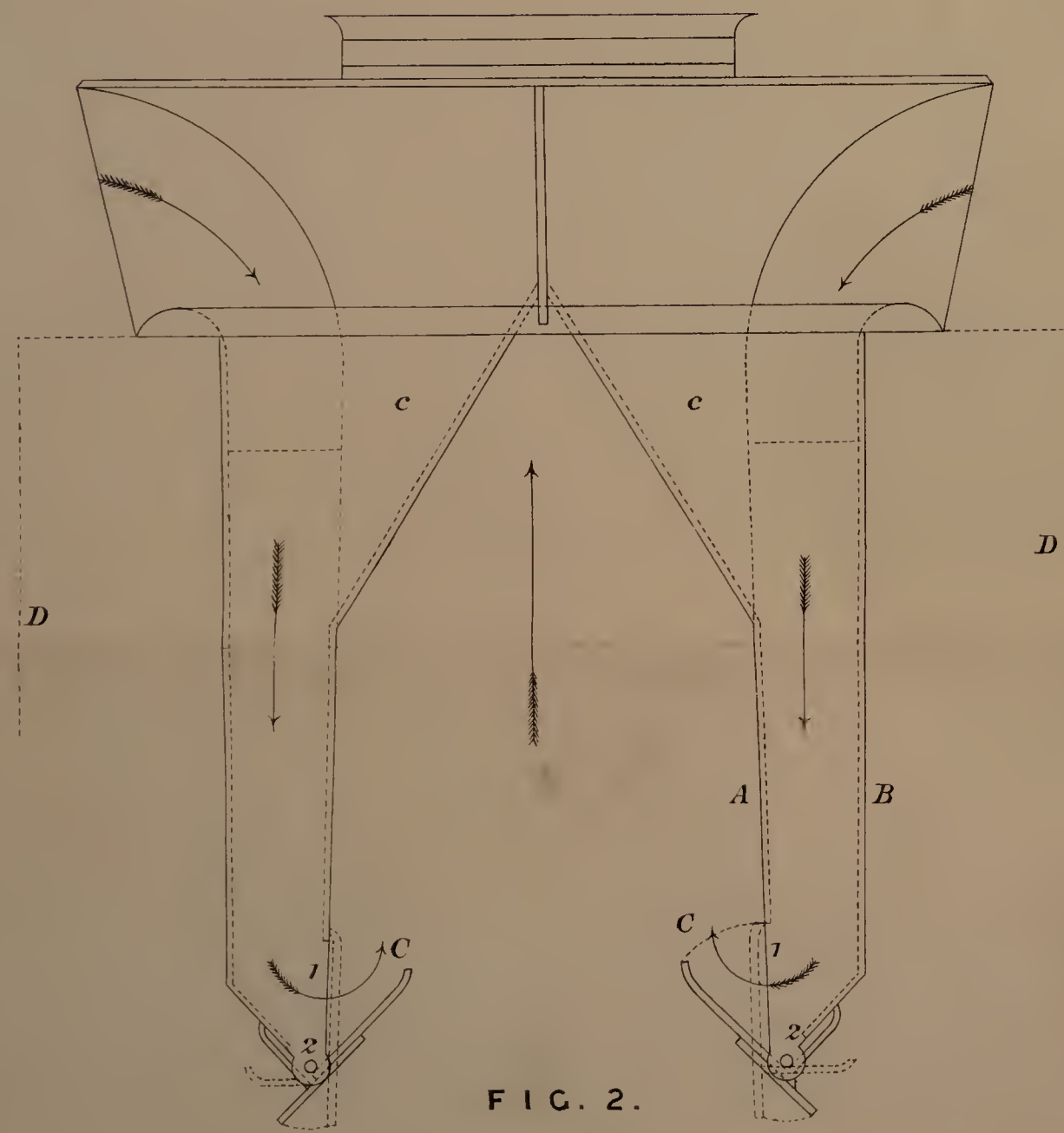


FIG. 2.

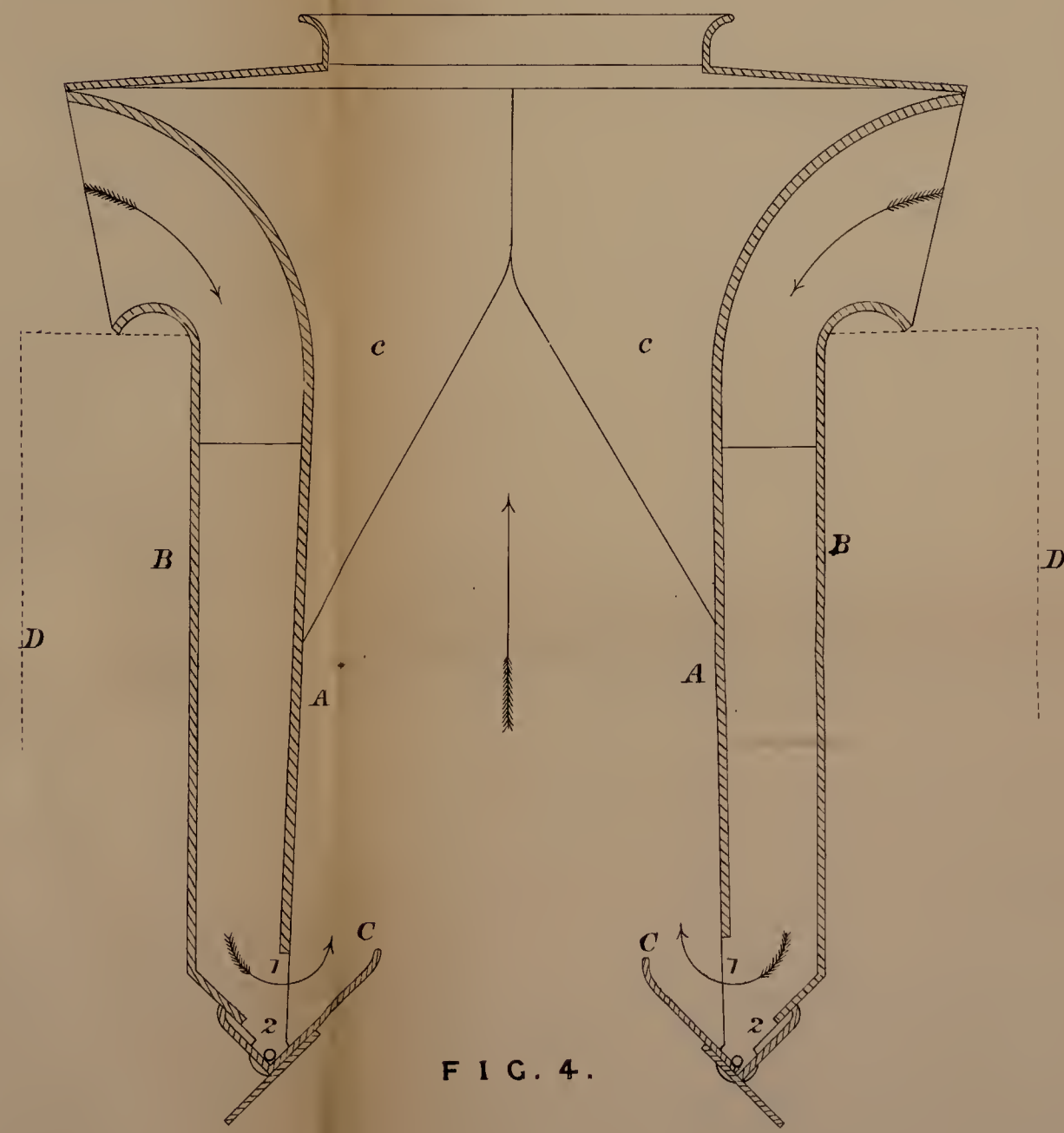


FIG. 4.

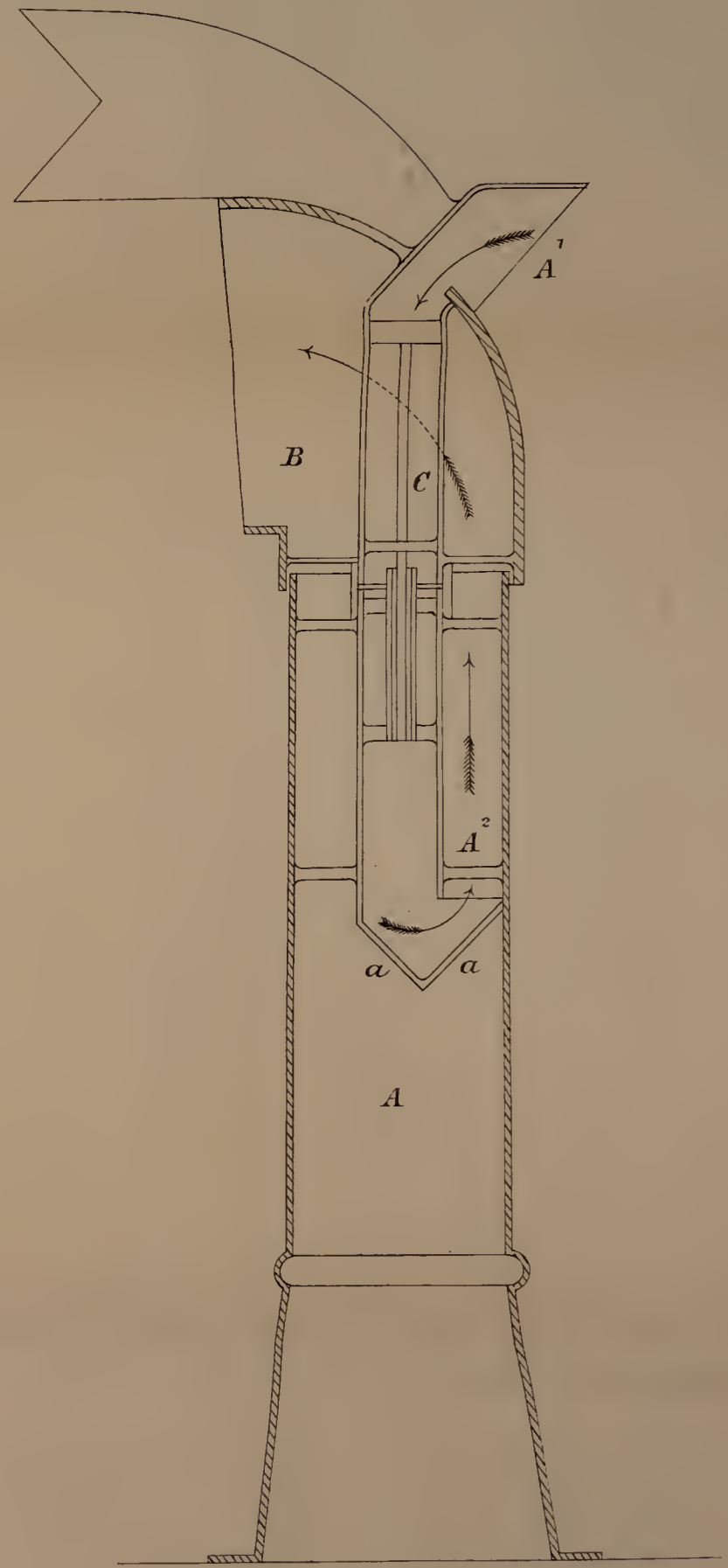


FIG. 1.

